

Max marks: 40

09/10/2016

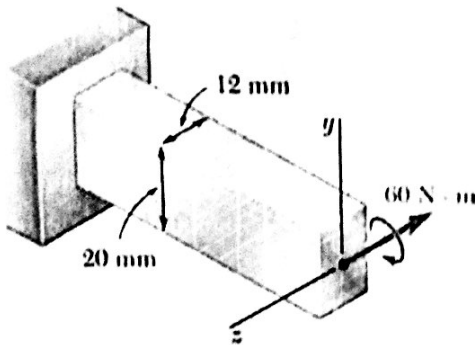
MECHANICS OF SOLIDS (APL108)
DEPARTMENT OF APPLIED MECHANICS, HTD

Question 1: [10 marks]

State the difference between Plane Stress and Plane Strain. Your answer should justify 10 marks.

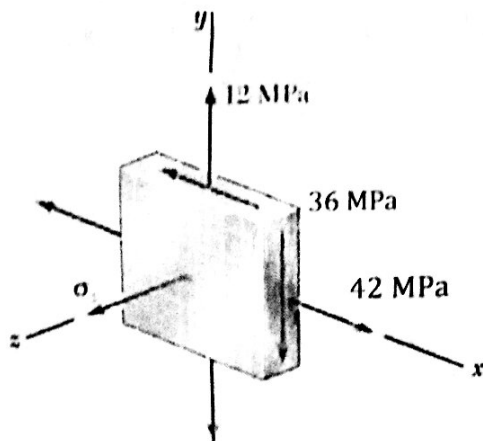
Question 2: [10 marks]

A 60 N·m couple is applied to the steel bar shown.



(a) Assuming that the couple is applied about the **z** axis as shown, determine the maximum stress and the radius of curvature of the bar. (b) Now solve part a, assuming that the couple is applied about the **y** axis. Use $E = 200$ GPa.

Question 3: [10 marks]



For the state of stress shown, determine the maximum shearing stress when (a) $\sigma_z = 24$ MPa (b) $\sigma_z = -24$ MPa (c) $\sigma_z = 0$ MPa

Question 4: [10 marks]

Show:
$$\frac{\partial^2 \epsilon_{yy}}{\partial z^2} + \frac{\partial^2 \epsilon_{zz}}{\partial y^2} = 2 \frac{\partial^2 \epsilon_{yz}}{\partial y \partial z}$$